laminate film is very thin, for example in the range of 0.0015 inches thick. A book **135** is then constructed for insertion into laminator **40** as is schematically illustrated FIG. **10**. Book **135** comprising core **33**, including at least one layer of ink **36** and at least one layer of overlamination film **38,39** is positioned between laminating plates which are preferably highly polished plates such as mirror finished stainless steel plates **90, 92**. Book **135** also comprises first and second laminating pads **60, 62** and first and second steel plates **70, 72** as is discussed above in relation to FIG. **7**.

When book **135** is positioned between upper and lower platens **42, 44** of laminator **40** as shown in FIG. **10**, the laminator is closed and a heat cycle in the range of 175° F. to 300° F. and most preferably in the range of 180° F. to 275° F. is applied to book **135** for a period of 10 to 25 minutes with a ram pressure that varies depending upon sheet size or the ram size of the laminator **40**, but which is typically approximately 1000 p.s.i. with an 18 inch diameter ram. The laminator **40** is then caused to execute a chill cycle, preferably with a corresponding increase in ram pressure. For example, the chill temperature may be in the range of 40° F. to 65° F. and last for a period of 10 to 25 minutes. A ram pressure increase of approximately 25% over the pressure used for the heat cycle has been found to be most preferable.

Subsequent to the above described second lamination cycle as illustrated in FIG. **10**, a sheet of plastic or other substrate core stock is provided which comprises at least core **33** with at least one surface **34,35** thereof covered by a layer of ink **36** and with at least one surface **34, 35** thereof covered by a layer of overlaminate film **36, 39**.

Preferable plastic device stock manufactured in accordance with the present invention comprises core **33** covered on both surfaces **34, 35** with a layer of ink **36** which is positioned between layers of overlaminate film **38, 39** all of which has been laminated together as described. One or more devices **10** then may be cut from the resulting plastic core stock and devices **10** will have a thickness of in the range of 0.005 inches to 0.033 inches with variation in overall thickness across the surfaces **12,14** thereof being no greater than approximately 0.0005 inches. The one or more devices **10** can thus be said to have a surface smoothness of approximately 0.0005 inches or better. Thus, a device **10** manufactured in accordance with the present invention includes at least one surface **12, 14** at preferably both surfaces **12, 14** that are sufficiently smooth and regular to receive dye sublimation printing.

Those skilled in the art will recognize that the forgoing descriptions has set forth the preferred embodiment of the invention in particular detail and it must be understood that numerous modifications, substitutions and changes may be undertaken without departing from the true spirit and scope of the present invention as defined by the ensuing claims.

What is claimed is:

1. A process for incorporating at least one electronic element in the manufacture of a plastic device comprising the steps of:

(a) providing first and second plastic core sheets;

(b) positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a core, said plastic core sheets defining a pair of inner and outer surfaces of said core;

(c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle comprising the steps of:

(I) heating said core to a first period of time;

(II) applying a first pressure to said core for a second prior of time such that said at least one electronic element is encapsulated by said core;

(III) cooling said core while applying a second pressure to said core;

(d) coating at least one of said outer surfaces of said core with a layer of ink; and

(e) applying a layer of overlaminate film to at least one outer surface of said core.

2. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim **1**, wherein said laminator apparatus has first and second laminating plates, at least one of said first and second laminating plates having a matte finish for creating a textured surface on at least one side of said core.

3. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim **2**, wherein each of said first and second laminating plates has a matte finish for creating said textured surface on both outer surfaces of said core.

4. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim **1**, wherein said first and second plastic core sheets are made from a material selected from the group consisting of polyvinyl chloride, polyester, and acrylonitrile-butadiene-styrene, each of said sheets having a thickness in the range of 0.005 inches–0.0125 inches.

5. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim **1**, wherein said first and second plastic core sheets have a thickness of approximate 0.005 inches–0.0125 inches.

6. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim **1**, wherein said second pressure is greater than said first pressure.

7. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim **6**, wherein said second pressure is at least approximately 25% greater than said first pressure.

8. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim **1**, wherein said core is heated in step (c) (I) to a temperature in the range of 275° F. to 400° F.; and said first period of time is at least five (5) minutes.

9. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim **1**, wherein said first ram pressure is approximately 1000 p.s.i. and said second period of time is at least 10 minutes.

10. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim **1**, wherein said step (d) is carried out utilizing a printing process.

11. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim **1**, wherein said step (d) is carried out utilizing a coating technique selected from the group consisting of silk screen printing, offset printing, letterpress printing, screen printing, roller coating, spray printing and litho-printing.

12. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim **1** wherein said step (e) of applying a layer of overlaminate film comprises the further steps of:

(a) positioning an overlaminate film on at least one ink coated surface of said core;

(b) subjecting said core to a second heat and pressure cycle comprising the steps of;

(I) heating said core to a temperature between approximately 175° F. to 300° F. for approximately 10 to 25 minutes;

(II) applying approximately 1000 p.s.i. ram pressure to said core; and

(III) cooling said core to a temperature in the range of approximately 40° F. to 65° F. for approximately 10 to 25 minutes.

13. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim 1, wherein said at least one electronic element is a micro-chip and an associated antenna of wire, copper etched, screen printed or litho-printed conductive inks or carbon inks.

14. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim 1, wherein said at least one electronic element is a micro-chip and an associated circuit board antenna.

15. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim 1, wherein said at least one electronic element is a read/write integrated chip and an associated antenna.

16. The process for incorporating at least one electronic element in the manufacture of a plastic device as recited in claim 1, wherein said at least one electronic element is a micro-chip and an associated printed antenna.

17. A hot lamination process for the manufacture of plastic devices, said process comprising the steps of:

(a) providing first and second plastic core sheets;

(b) positioning at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic sheets to form a layered core;

(c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle comprising the steps of:

(I) heating said core in said laminator apparatus, in the presence of a minimal first ram pressure, to a temperature which causes controlled flow of said plastic which makes up said first and second plastic core sheets;

(II) applying a second pressure uniformly across said core for encapsulating said at least one electronic element within said controlled flow plastic;

(III) subsequently cooling said core in conjunction with the concurrent application of a third pressure uniformly across said core, said core including upper and lower surfaces.

18. The process as recited in claim 15 wherein said first and second core layers are devoid of any appreciable cut outs.

19. A process for incorporating an electronic element in a plastic device, comprising the steps of:

(a) providing first and second plastic core sheets;

(b) positioning the electronic element between the first and second plastic core sheets to form a core;

(c) positioning the core in a laminator apparatus, and subjecting the core to a heat and pressure cycle, the heat and pressure cycle comprising the steps of:

(I) heating the core;

(II) applying a first pressure to the core such that the electronic element is encapsulated by the core; and

(III) cooling the core while applying a second pressure to the core.

20. The process of Claim 19, wherein step (c)(III) comprises cooling the core while applying a second pressure to the core, wherein the second pressure is greater than the first pressure.

21. The process of Claim 20, wherein step (b) comprises positioning the electronic element in the absence of a non-electronic carrier between the first and second plastic core sheets to form the core.

22. The process of Claim 20, wherein step (b) comprises positioning the electronic element in the absence of a non-electronic carrier directly between the first and second plastic core sheets to form the core.

23. The process of Claim 19, wherein step (c)(III) comprises cooling the core while applying a second pressure to the core, wherein the second pressure is approximately at least 10% greater than the first pressure.

24. The process of Claim 19, wherein step (c)(I) comprises heating the core under a third pressure, wherein the third pressure is less than the first pressure.

25. The process of Claim 20, wherein step (c)(II) comprises applying the first pressure uniformly to the core such that the electronic element is encapsulated by the core.

26. The process of Claim 20, wherein step (c)(III) comprises cooling the core while applying the second pressure uniformly to the core.

27. The process of Claim 20, wherein the electronic element comprises a micro-chip.

28. The process of Claim 27, wherein the electronic element further comprises a circuit board antenna.

29. The process of Claim 27, wherein the electronic element includes a protective coating thereon.

30. A process for manufacturing a plastic device that includes an electronic element therein, comprising the steps of:

(a) providing first and second plastic core sheets;

(b) positioning the electronic element between the first and second plastic core sheets to form a core;

(c) positioning the core in a laminator apparatus;

(d) heating the core;

(e) causing the laminator apparatus to apply a first pressure to the core such that the electronic element is encapsulated by the core; and

(f) cooling the core while the laminator apparatus applies a second pressure to the core, wherein the second pressure is greater than the first pressure.

31. The process of Claim 30, wherein step (f) comprises cooling the core while the laminator apparatus applies the second pressure to the core, wherein the second pressure is approximately at least 10% greater than the first pressure.

32. The process of Claim 31, wherein step (b) comprises positioning the electronic element in the absence of a non-electronic carrier between the first and second plastic core sheets to form the core.

33. The process of Claim 31, wherein step (b) comprises positioning the electronic element in the absence of a non-electronic carrier directly between the first and second plastic core sheets to form the core.

34. The process of Claim 30, wherein the electronic element comprises a micro-chip.

35. The process of Claim 34, wherein the electronic element further comprises a circuit board antenna.

36. The process of Claim 34, wherein the electronic element includes a protective coating thereon.

37. A process for incorporating an electronic element in a plastic device, wherein the electronic element has a top surface and a bottom surface, comprising the steps of:

(a) providing top and bottom plastic core sheets;

(b) positioning the electronic element between the top and bottom plastic core sheets to form a core, wherein the top surface of the electronic element is in contact with the top plastic core sheet;

(c) positioning the core in a laminator apparatus, and subjecting the core to a heat and pressure cycle, the heat and pressure cycle comprising the steps of:

(I) heating the core;

(II) applying a first pressure to the core so that the electronic element is encapsulated by the core; and

(III) cooling the core while applying a second pressure to the core, wherein the second pressure is greater than the first pressure.

38. The process of Claim 37, wherein step (c)(III) comprises cooling the core while applying a second pressure to the core, wherein the second pressure is approximately at least 10% greater than the first pressure.

39. The process of Claim 37, wherein step (b) comprises positioning the electronic element between the top and bottom plastic core sheets to form the core, wherein the top and bottom surfaces of the electronic element are in contact with the top and bottom plastic core sheets, respectively.

40. The process of Claim 37, wherein step (b) comprises positioning the electronic element in the absence of a non-electronic carrier between the top and bottom plastic core sheets to form the core.

41. The process of Claim 37, wherein step (b) comprises positioning the electronic element in the absence of a non-electronic carrier directly between the top and bottom plastic core sheets to form the core.

42. The process of Claim 37, wherein the electronic element comprises a micro-chip.

43. The process of Claim 42, wherein the electronic element further comprises a circuit board antenna.

44. The process of Claim 42, wherein the electronic element includes a protective coating thereon.